Electronic Version
Stylesheet Version v1.1.1

Claims

[c1] A rotor of a dynamoelectric machine, the rotor comprising an outer peripheral surface, oppositely-disposed radial end surfaces, axially-extending slots in the outer peripheral surface of the rotor, and field windings in the slots, the field windings axially projecting from the end surfaces of the rotor and being connected together outside of the slots by field winding end turns, the slots having cross-sections of sufficient size so that the field windings are present within a first portion of each slot and not present within a second portion of each slot, the rotor comprising a retaining system surrounding at least one of the field winding end turns at at least a first end of the rotor, the retaining system comprising:
a shield member surrounding the field winding end turns, the shield member having flanges that are received in the second portions of the slots adjacent the end surface at the first end of the rotor;
a retainer member surrounding the shield member and inhibiting radially-outward movement of the shield member, the retainer member being formed of a material that is more rigid than the material of the shield member; and

means for inhibiting axial movement of the retaining system relative to the rotor.

[c2] A rotor according to claim 1, wherein the retainer member is bonded to the shield member.

[c3] A rotor according to claim 1, wherein the retainer member is shrink-fit on the shield member.

[c4] A rotor according to claim 1, wherein the material of the retainer member is a fiber-reinforced composite material.

[c5] A rotor according to claim 1, wherein the shield member is formed of an electromagnetic shielding material.

[c6] A rotor according to claim 1, wherein the inhibiting means comprises a circumferential groove in the outer peripheral surface of the rotor and a ring received in the groove and engaged with the flanges of the shield member.

[c7] A rotor according to claim 6, wherein each of the flanges has a radially-extending portion axially inboard from the ring and abutting the ring to prevent axially outboard movement of the shield member.

[c8] A rotor according to claim 6, wherein each of the flanges has a groove circumferentially aligned with the groove in

the outer peripheral surface of the rotor, the ring being received in the grooves of the flanges.

[c9] A rotor according to claim 1, wherein the flanges are received in the second portions of the slots so as to inhibit radially outward movement of the field windings within the slots.

[c10] A rotor according to claim 1, wherein the slots in the rotor and each of the flanges have complementary tapered cross-sectional shapes that inhibit radially outward movement of the flanges within the slots.

[c11] A rotor according to claim 1, wherein the outer peripheral surface of the rotor has a tapered portion adjacent the end surface at the first end of the rotor, the tapered portion tapering radially inward in a direction toward the end surface.

[c12] A rotor according to claim 11, wherein the retainer member has a tapered inboard end surrounding and complementary to the tapered portion of the outer peripheral surface.

[c13] A rotor according to claim 12, wherein the flanges have tapered portions complementary to the tapered inboard end of the retainer member, the tapered inboard end of the retainer member surrounding the tapered portions of

the flanges.

[c14] A rotor of a generator used in power generation of alternating current delivered to a distribution network, the rotor comprising a cylindrical body having an outer peripheral surface and radial end surfaces at oppositely-disposed ends of the cylindrical body, spindles axially extending from the end surfaces of the cylindrical body, axially-extending slots in the outer peripheral surface of the cylindrical body so as to define radially-extending teeth at the outer peripheral surface, a circumferential groove in the outer peripheral surface adjacent each of the end surfaces, and field windings in the slots, the field windings axially projecting from the end surfaces of the cylindrical body and being connected together outside of the slots by field winding end turns, the slots having cross-sections of sufficient size so that each of the field windings is present within a first portion of each slot and not present within a second portion of each slot, the rotor further comprising first and second retaining systems surrounding the field winding end turns at the ends of the cylindrical body, each of the retaining systems comprising:

an annular-shaped electromagnetic shield member surrounding one of the field winding end turns, the electromagnetic shield member having a circumferential row of

flanges extending axially from an inboard end thereof, the flanges being individually received in the second portions of the slots open to one of the end surfaces of the rotor so that each of the flanges is between adjacent pairs of the teeth of the cylindrical body, each of the flanges having a radially-outward extending portion;

a ring received in one of the grooves of the cylindrical body, axially outboard from the radially-outward extending portions of the flanges, and abutting the radially-outward extending portions of the flanges to prevent axially outboard movement of the retaining system; and

an annular-shaped retainer member surrounding and attached to the electromagnetic shield member to inhibit radially-outward movement of the electromagnetic shield member, the retainer member being formed of a graphite fiber-reinforced composite material that is less dense and more rigid than the material of the electromagnetic shield member.

[c15] A rotor according to claim 14, wherein the retainer member is bonded to the electromagnetic shield member.

[c16] A rotor according to claim 14, wherein the retainer member is shrink-fit on the electromagnetic shield member.

[c17] A rotor according to claim 14, wherein each of the flanges has a groove circumferentially aligned with the groove in the outer peripheral surface of the cylindrical body, the ring being received in the grooves of the flanges.

[c18] A rotor according to claim 14, wherein the flanges are received in the second portions of the slots so as to inhibit radially outward movement of the field windings within the slots.

[c19] A rotor according to claim 14, wherein the slots in the cylindrical body and each of the flanges have complementary tapered cross-sectional shapes that inhibit radially outward movement of the flanges within the slots.

[c20] A rotor according to claim 14, wherein the teeth and the flanges have tapered portions adjacent the end surface at the cylindrical body, the tapered portions of the teeth and the flanges taper radially inward in a direction toward the end surface, the retainer member has a tapered inboard end complementary to the tapered portions of the teeth and the flanges, and the tapered inboard end of the retainer member surrounds the tapered portions of the teeth and the flanges.